ABSTRACT OF THE DISCLOSURE

The invention features a method of training a user to become an expert in identifying an object in an image, by querying a computer system. The computer system has a lexicon of photo-interpreters. The user can formulate object extraction rules, as he or she becomes an expert in object recognition and extraction. The method consists of generating a database to be queried by at least one expert photo analyst. A programming language is provided to generate object extraction rules against the generated database. The programming language has a vocabulary for facilitating descriptions of objects to be identified. Graphical results of the user's queries are interactively displayed to aid in determining whether an object has been identified by the user. In a more advanced embodiment, the user can mark a feature of interest of the image and direct the computer system to generate descriptive words, phrases, rules, images and text files for defining that feature of interest. First, a hyperspectral image cube that has a number of spectral regions, is represented by a set of fraction planes and texture transforms. In terms of the fraction plane approach, to achieve real time processing, a mean spectral reading value is obtained for each of the spectral regions. The mean spectral reading values are then used to build a pseudo multivariate distribution of the values. Using a Newton gravity model, the cumulative influence of substantially all

of the spectral regions is computed for at least one of the spectral regions. Recognizable features are then extracted from the hyperspectral image cube. To determine how close or far one object is from another, a number of equally-weighted decisions is made, the final measure of proximity being the sum of all of the decisions. If each pixel in the image cube is compared to a calibrated spectra or a given pixel in the scene, fraction planes can be created, dependent on the percentage of match or comparison against the specified, calibrated spectra sample. In terms of the texture transform approach, each ground pixel is represented by a set of spectral readings, forming a vector. By passing an (n x n) window over the image (ground) surface, the certain pixel can be represented by an average of 8 correlation coefficients computed between the certain pixel and its 8 neighbors in a (3x3) case. If every pixel on the ground is represented by such coefficients, the resultant image is a textural transform of a hyperspectral image cube. Since many hundreds of image bands have been reduced to a few texture transforms, they can be used as a means to train users to become experts in using the inventive system, making the programming language the user's language.